Report for IAU Commission 4 from the United States Naval Observatory (USNO)

This report covers activity in the Astronomical Applications (AA) Department since the XXVIth General Assembly in Prague. The AA Department employs 13 scientists in three divisions: The Nautical Almanac Office (NAO), the Software Products Division (SPD), and the Science Support Division (SSD). During the reporting period, A. Monet, formerly at USNO's Flagstaff Station, was appointed chief of the SPD and J. Bartlett transferred to the SPD staff from USNO's Astrometry Department. G. Kaplan became a part-time contractor to USNO, working within the AA Department. M. Murison transferred to the Flagstaff Station.

Kaplan served as vice president of Commission 4, and J. Bangert and S. Urban served on the organizing committee. Bangert also served as a member of the Standards of Fundamental Astronomy (SOFA) reviewing board. J. Hilton served as a member of the inter-division Working Group on Cartographic Coordinates and Rotational Elements. M. Efroimsky chaired the local organizing committee for IAU Symposium 261, held in April 2009 at Virginia Beach USA.

Publication of *The Astronomical Almanac* and *The Astronomical Almanac Online*, *The Nautical Almanac*, *The* (U.S.) *Air Almanac*, and *Astronomical Phenomena* continued as a joint activity between Her Majesty's Nautical Almanac Office of the United Kingdom and the NAO. A new memorandum of understanding between the parent organizations, governing the collaboration, became effective in August 2008. *The Astronomical Almanac* for 2009, released in January 2008, was the first edition to incorporate the resolutions adopted by the IAU in 2006. *The Air Almanac* transitioned from a paper publication to an electronic (CD-ROM) publication effective with the 2009 edition.

Significant progress was made on a major revision of *The Explanatory Supplement to the Astronomical Almanac*, in collaboration with P.K. Seidelmann (Univ. of Virginia) and numerous contributors. The book is expected to be sent to the printer by the end of 2009.

Version 3.0 of the Naval Observatory Vector Astrometry Subroutines (NOVAS), which implements relevant IAU resolutions adopted from 1997 through 2006, will be released by the end of 2009. The software will be available in both Fortran and C editions.

Version 2.2 of the *Multiyear Interactive Computer Almanac* (MICA), which incorporates NOVAS 3.0, was in the final stages of testing as of August 2009. MICA is available for computers running Microsoft Windows and Apple Mac OS operating systems.

All USNO departmental Web sites were consolidated into a single Web portal accessible at *http://www.usno.navy.mil/USNO*. Prior to the consolidation, usage of the AA Department Web site varied from about 0.5 to 2.8 million visits per month.

A modest research program in positional astronomy, dynamical astronomy, and navigation continued within the department. Research topics included the

spin evolution of Iapetus, the theory of bodily tides, determination of asteroid masses, and new methods of celestial navigation.

Other projects underway at USNO and of interest to Commission 4 include the USNO CCD Astrograph Catalog (UCAC), and observations of solar system bodies made with the Flagstaff Astrometric Scanning Transit Telescope (FASTT). Additional information on these projects can be found at *http://www.usno.navy.mil/USNO/astrometry/*.